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National Voluntary Laboratory Accreditation Program

Wood Based Products

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NIST HANDBOOK 150-9

U.S. Department of Commerce
Technology Administration
National Institute of Standards and Technology

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1994
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[1] At Boulder, CO 80303.
[2] Some elements at Boulder, CO 80303.

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November 1994

U.S. Department of Commerce
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Technology Administration
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National Institute of Standards and Technology
Arati Prabhakar, Director

National Institute of Standards and Technology
NIST Handbook 150–9
72 pages (November 1994)
CODEN: NIHAE2

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1994

For sale by the Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402-9325

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PREFACE

NIST Handbook 150-9 presents the technical requirements of the National Voluntary Laboratory Accreditation Program (NVLAP) for the Wood Based Products (WBP) field of accreditation. It is intended for information and use by staff of accredited laboratories, those laboratories seeking accreditation, other laboratory accreditation systems, users of laboratory services, and others needing information on the requirements for accreditation under the WBP program.

This publication supplements NIST Handbook 150, *NVLAP Procedures and General Requirements*, which contains Part 285 of Title 15 of the U.S. Code of Federal Regulations (CFR) plus all general NVLAP procedures, criteria, and policies. The criteria in NIST Handbook 150 encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987). Handbook 150-9 contains information that is specific to the WBP program and does not duplicate information contained in the Procedures and General Requirements. The numbering of the sections of this handbook is patterned after Handbook 150; for example, Section 285.3 of Handbook 150 presents the description and goal of NVLAP, whereas Section 285.3 of Handbook 150-9 presents the description of the WBP program. Where there is no material specific to the field of accreditation, the section number is omitted.

NIST policy requires SI units; however, when trade practices use customary units, such as with the wood based products industry, customary units are preferred and are used in this report.

Any questions or comments on this handbook should be submitted to the National Institute of Standards and Technology/NVLAP, Building 411, Room A162, Gaithersburg, MD 20899; phone (301) 975-4016; FAX (301) 926-2884.

ACKNOWLEDGMENTS

The technical requirements for the Wood Based Products (WBP) Program in this handbook were developed in cooperation with the U. S. Department of Agriculture - Forest Service - Forest Products Laboratory (FPL). FPL assisted NVLAP by providing technical support and general consultation. FPL staff hosted a number of meetings at which the technical requirements for the WBP Program were reviewed and discussed by government and industry representatives. The assistance of FPL staff members, J. Dobbin McNatt, Russell Moody, Joe Murphy, George Myers, Bryan River, and Erwin Schaffer, is greatly appreciated. Erwin Schaffer is especially acknowledged for his efforts, encouragement, and guidance given to the WBP Program. The authors also express their appreciation to the specialists from a number of industries and trade associations for their voluntary participation in suggesting and reviewing the technical requirements proposed for the program.

The authors gratefully acknowledge Vanda White, and Channing Monti of NVLAP for their editing, revising, and final publishing of the handbook.

TABLE OF CONTENTS

PREFACE iii

ACKNOWLEDGMENTS iv

SUMMARY vi

Sec. 285.1 Purpose 1

Sec. 285.2 Organization of procedures 1

Sec. 285.3 Description of Wood Based Products program 1

Sec. 285.4 References 1

Sec. 285.5 Definitions 2

Sec. 285.6 NVLAP documentation 3

Sec. 285.22 Assessing and evaluating a laboratory 4

Sec. 285.23 Granting and renewing accreditation 6

Sec. 285.33 Criteria for accreditation 6
- (c) Quality system, audit and review 6
- (d) Personnel 7
- (f) Equipment and reference materials 8
- (g) Measurement traceability and calibration 8
- (h) Calibration and test methods 9
- (j) Records 9
- (k) Certificates and reports 10
- (m) Outside support services and supplies 10

APPENDICES
- SAMPLE ACCREDITATION DOCUMENTS A-1
- GENERAL OPERATIONS CHECKLIST B-1
- SPECIFIC OPERATIONS CHECKLIST C-1
- TEST METHOD SELECTION LIST D-1
- CRITICAL ELEMENTS E-1
- ON-SITE ASSESSMENT - TEST METHOD REVIEW F-1

SUMMARY

Any laboratory (including commercial, manufacturer, university, or federal, state, or local government laboratory) that tests in accordance with the applicable standard test methods may apply for NVLAP accreditation in the Wood Based Products (WBP) program. Accreditation will be granted to a laboratory that satisfactorily meets the conditions for accreditation defined in the NIST Handbook 150, *NVLAP Procedures and General Requirements*, which contains Title 15, Part 285 of the Code of Federal Regulations. These conditions include satisfactory performance in selected proficiency testing as required, and fulfilling the on-site assessment requirements, including resolution of identified deficiencies. The names of NVLAP-accredited laboratories are published in the NVLAP annual directory and other media to which information is regularly provided.

Test services covered: The scope of the WBP program covers standard test methods for wood based products given in the Test Method Selection List (Appendix D).

Period of accreditation: One year, renewable annually.

On-site assessment: Visit by a technical expert to determine compliance with the NVLAP criteria before initial accreditation and every two years thereafter. Additional monitoring visits as required.

Assessors: Technical experts with experience in the appropriate fields of testing.

Proficiency Testing: NVLAP will perform proficiency testing when sufficient laboratories have enrolled such that it is economically feasible. Each laboratory will be required to test and analyze proficiency testing sample material(s) for specific test methods. Proficiency testing will be conducted semiannually. Advance notice and instructions will be given before testing is scheduled. The completed test data report will be sent to NVLAP or, as directed, to the proficiency testing contractor. A summary of results will be sent to the participants.

Granting Accreditation: Based upon satisfactory on-site assessment and resolution of deficiencies, proficiency testing, and technical evaluation of applicable laboratory information.

Fees: Payments are required as listed on the fee schedule, including the administrative/technical support fee, on-site assessment fee, proficiency testing fee, and test method fee.

Sec. 285.1 Purpose

The purpose of this handbook is to set out procedures and technical requirements for NVLAP accreditation of laboratories which perform test methods covered by the Wood Based Products (WBP) program. It complements and supplements the NVLAP programmatic procedures and general requirements found in NIST Handbook 150. The interpretive comments and additional requirements contained in this handbook make the general NVLAP criteria specifically applicable to the WBP program. The quality system requirements are designed to comply with the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002.

Sec. 285.2 Organization of procedures

(a) The procedures described in this handbook are organized to cross-reference with NIST Handbook 150, *NVLAP Procedures and General Requirements*.

(b) In addition, the handbook contains six appendices:

(1) Appendix A provides examples of a Certificate of Accreditation and a Scope of Accreditation for the WBP program;

(2) Appendix B provides the General Operations Checklist, which NVLAP assessors use during an on-site technical assessment to evaluate a laboratory's ability to conduct testing in general;

(3) Appendix C provides the Specific Operations Checklist, which NVLAP assessors use during an on-site technical assessment of a laboratory that tests the performance properties of wood based products;

(4) Appendix D lists the standard test methods and their accompanying NVLAP Codes for the WBP program as given on the NVLAP Test Method Selection List;

(5) Appendix E gives a description of a critical element summary as used by NVLAP assessors during an on-site technical assessment; and

(6) Appendix F provides the sheets that the assessor completes in conducting a test method review.

Sec. 285.3 Description of Wood Based Products program

The NVLAP program for Wood Based Products provides for laboratory accreditation to assure that standard test procedures for chemical, physical, mechanical, fire performance, formaldehyde, and treated-wood characteristics are followed when testing wood based products. The WBP program uses standard test methods as shown in Appendix D from the American Institute of Timber Construction (AITC), American National Standards Institute (ANSI), American Plywood Association (APA), American Society for Testing and Materials (ASTM), American Wood Preservers' Association (AWPA), Canadian Standards Association (CSA), European Committee for Standardization (CEN), Hardwood Plywood and Veneer Association (HPVA), National Institute of Standards and Technology (NIST), and the National Particleboard Association (NPA).

The WBP program was developed in response to a request made in 1992 by the APA and subsequently supported by the NPA, and U.S. Department of Housing and Urban Development (HUD). The letters requesting the development of the program indicated the importance of international acceptance and reciprocity for the program in laboratory accreditation to promote international trade.

Sec. 285.4 References

(a) The following documents are referenced or cited in this handbook:

(1) ISO/IEC Guide 25, *General Requirements for the Competence of Calibration and Testing Laboratories*, and ISO 9002, *Quality Systems—Model for Quality Assurance in Production and Installation*; available from:

American National Standards Institute (ANSI)
11 West 42 Street, 13th Floor
New York, NY 10036

Order Phone: (212) 642-4900
Order Fax: (212) 302-1286;

(2) NIST Handbook 150, *NVLAP Procedures and General Requirements*; available from:

NIST/NVLAP
Building 411, Room A162
Gaithersburg, MD 20899

Phone: (301) 975-4016
Order Fax: (301) 926-2884.

(b) The most recent publication of the standard(s) for the test method(s) for which the laboratory is accredited shall be available as reference(s). For the WBP program, these standards are listed in Appendix D and can be obtained from:

(1) American Institute of Timber Construction (AITC)
7012 S. Revere Parkway, Suite 140
Englewood, CO 80112

Phone: (303) 792-9559
FAX: (303) 792-0669;

(2) ANSI (see (a) above);

(3) American Plywood Association (APA)
P. O. Box 11700
Tacoma, WA 98411-0700

Phone: (206) 565-6600
FAX: (206) 565-7265;

(4) American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103-1187

Phone: (215) 299-5400
FAX: (215) 977-9679;

(5) American Wood-Preservers' Association (AWPA)
P. O. Box 286
Woodstock, MD 21163-0286

Phone: (410) 465-3169
FAX: (410) 465-3195;

(6) Canadian Standards Association (CSA)
178 Rexdale Blvd.
Rexdale, Ontario
M9W 1R3 CANADA

Phone: (416) 747-4104
FAX: (410) 747-2575;

(7) European Committee for Standardization, Brussels, Belgium

(CEN Standards are available from ANSI, International Publications, at address listed in (a) above.)

Order Phone: (212) 642-4995;

(8) Hardwood Plywood and Veneer Association
P. O. Box 2789
Reston, VA 22090

Phone: (703) 435-2900
FAX: (703) 435-2537;

(9) NIST/Standards Management Program
Administration Building, Room A625
Gaithersburg, MD 20899

Phone: (301) 975-4025
FAX: (301) 963-2871;

(10) National Particleboard Association
18928 Premiere Court
Gaithersburg, MD 20879

Phone: (301) 670-0604
FAX: (301) 840-1252.

Sec. 285.5 Definitions

Composite panel: A veneer-faced panel with a reconstituted wood core. The flakeboard core may be random or have alignment in the direction 90° from the grain direction of the veneer faces.

Critical elements: A compilation of summary statements of the key provisions of a standard test method that guides assessors in applying a common objective assessment of a laboratory's ability to conduct tests.

Glued-laminated timbers (glulam): Two or more layers of wood glued together with the grain of all layers or laminations approximately parallel.

Laminated veneer lumber (LVL): A structural lumber manufactured from veneers laminated into a panel with the grain of all veneer running parallel to each other. The resulting panel is normally manufactured in 3/4- to 1-1/2-inch thicknesses and ripped to common lumber widths of 1-1/2 to 11-1/2 inches, or wider (see statement in Preface on NIST policy with regard to use of SI units).

Medium-density fiberboard (MDF): A panel product manufactured from lignocellulosic fibers combined with a synthetic resin or other suitable binder. The panels are manufactured to a density of 31 pcf (0.50 specific gravity) to 55 pcf (0.88 specific gravity) by the application of heat and pressure by a process in which the interfiber bond is substantially created by the added binder. Other materials may have been added during manufacturing to improve certain properties.

Oriented strand board: A type of particle panel product composed of strand-type flakes which are purposefully aligned in directions which make a panel stronger, stiffer, and with improved dimensional properties in the alignment directions than a panel with random flake orientation.

Particleboard: A generic term for a material manufactured from wood particles or other lignocellulosic material and a synthetic resin or other suitable binder.

Plywood: A glued wood panel made up of relatively thin layers of veneer with the grain of adjacent layers at right angles, or of veneer in combination with a core of lumber or of reconstituted wood. (See **Composite panel.)** The usual constructions have an odd number of layers.

Plywood, hardwood: A panel composed of an assembly of layers or piles of veneer, or veneers in combination with lumber core, particleboard core, MDF core, hardboard core, or of special core material, joined with an adhesive. Except for special constructions, the grain of alternate plies is always approximately at right angles, and the face veneer is usually a hardwood species.

Quality assurance: All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.

Quality control: The operational techniques and activities that are used to fulfill requirements for quality.

Structural sandwich construction: A layered construction comprising a combination of relatively high-strength facing materials intimately bonded to and acting integrally with a low-density core material.

Structural-use panel: A panel product composed primarily of wood which, in its commodity end use, is essentially dependent upon certain mechanical and/or physical properties for successful end-use performance.

Treat (verb): To apply a preservative or fire retardant to wood.

- Wood Preservation: The art of protecting timber against the action of destructive agents. Usually refers to the treatment of wood with chemical substances (preservatives) which reduce its susceptibility to deterioration by fungi, insects, or marine borers.

- Treatment, Fire-Retardant: Treatment of wood under pressure with chemicals to reduce its flame spread, fuel contribution, and smoke development.

Waferboard: A particle panel product made of wafer-type flakes, usually manufactured to possess equal properties in all directions parallel to the plane of the panel.

Wood based products: Broad term for manufactured wood products, including particleboard, medium-density fiberboard, structural use panels (plywood, composite panels, oriented strandboard, and waferboard), hardwood plywood, structural composite lumber, glued-laminated timbers, I-joists, laminated veneer lumber, sandwich constructions, and treated wood products.

Sec. 285.6 NVLAP documentation

(a) Test Method Selection List

Depending on the breadth of its testing capabilities, a laboratory may seek accreditation to all or only selected methods offered in the WBP program. The Test Method Selection List, provided to the laboratory seeking accreditation as part of the NVLAP application package, lists the methods that comprise the program.

Appendix D lists the test methods currently available for accreditation under the WBP program. A laboratory may request to add test methods not listed in Appendix D. The test methods in Appendix D are placed in one of eight groups as follows:

(1) General Wood Products;

(2) Particleboard and Medium-Density Fiberboard:
- Physical and Mechanical Properties;
- Formaldehyde;

(3) Structural-Use Panels (plywood, composite panels, oriented strandboard, and waferboard);

(4) Hardwood Plywood;

(5) Structural Composite Lumber, Glulam, I-Joists, Laminated Veneer Lumber;

(6) Sandwich Constructions;

(7) Treated Wood Products; and

(8) Fire Tests.

Any test method additions will be handled in accordance with NVLAP procedures for adding to or modifying an established LAP (see Handbook 150, Sec. 285.18).

(b) Checklists

Checklists contain definitive statements or questions about all aspects of the NVLAP criteria for accreditation. NVLAP programs incorporate two types of checklists:

(1) The NVLAP General Operations Checklist addresses factors applicable to evaluating a laboratory's ability to conduct testing in accordance with the procedures and general requirements for accreditation. The factors include, but are not limited to, the laboratory's organization, management, and quality system in addition to its testing competency.

The General Operations Checklist, presented in Appendix B, is numbered to correspond to the requirements in NIST Handbook 150. The comment sheets are used by the assessor to explain findings and deficiencies noted on the checklist, as well as to make comments on aspects of the laboratory's performance other than deficiencies.

(2) The Specific Operations Checklist contains statements or questions that are specific to the test methods in the WBP program and focus on the testing requirements for the methods with emphasis on performing the tests, testing accuracy, instrumentation, calibration, personnel competency, and test reporting.

The Specific Operations Checklist is presented in Appendix C, along with comment sheets similar to those used with the General Operations Checklist.

Sec. 285.22 Assessing and evaluating a laboratory

(a) On-Site Assessment

(1) The NVLAP assessor will request manuals and/or documented procedures in advance of the on-site assessment to reduce time at the laboratory. Documents supplied in advance will be returned. The laboratory should be prepared for conducting test demonstrations, have equipment in good working order, and be ready for examination according to the requirements identified in this handbook, NIST Handbook 150, the laboratory's quality manual, and its written test procedures. The assessor will need time and work space to complete assessment documentation during the time at the laboratory.

(2) NVLAP technical assessors are provided with "critical elements" in addition to the checklists described in 285.6, *NVLAP documentation,* to help assure the completeness, objectivity, and uniformity of the on-site assessment. The format of a critical element is presented in Appendix E.

(3) Along with the Specific Operations Checklist, the assessor uses the instructions and comment sheets shown in Appendix F in reviewing the laboratory's ability to perform the test methods. The test method review ranges from observing tests to having laboratory staff describe the test procedures. The assessor notes on the On-Site Assessment - Test Method Review Summary (p. F-4) the depth into which each part of the test method was reviewed.

The test method review is directly connected to the critical elements. Note that the column

headings of the Test Method Review Summary are essentially the same as the headings of the critical elements.

(4) An assessor performs the following activities during a typical on-site assessment:

(i) Conducts an entry briefing with the laboratory manager to explain the purpose of the on-site visit and to discuss the schedule for the day(s). At the discretion of the laboratory manager, other staff may attend the briefing.

(ii) Reviews laboratory quality manual and its implementation, and records, including the following:

- sample identification and tracking procedures and copies of completed test reports;

- records of periodic internal audits and use of quality control procedures and participation in interlaboratory comparisons or other similar programs; and

- personnel records, including résumés and job descriptions of key personnel and competency evaluations for all staff members who routinely perform the test method for which accreditation is sought.

At least one laboratory staff member must be available to answer questions; however, the assessor may wish to review the documents alone. The assessor usually does not ask to take any laboratory documents with him and documents previously supplied will be returned.

(iii) Physically examines equipment and facilities and observes the demonstration of selected procedures by appropriate personnel assigned to conduct the tests, and interviews those personnel. The demonstrations must include sample test material(s), preparation of devices, establishment of test conditions and the setup and use of major equipment. The assessor may provide the proficiency test sample and request a specific demonstration.

(iv) Completes an On-Site Assessment Report, which contains the minimum requirements prescribed in NIST Handbook 150, Sec. 285.22(b)(2), as well as copies of the completed checklists. At the exit briefing, a discussion of the assessment is carried out. The first page of the report is signed by the assessor and the laboratory's Authorized Representative to acknowledge the discussion but does not necessarily indicate agreement; appeals may be made through NVLAP. All observations made by the NVLAP assessor are held in the strictest confidence.

(b) Proficiency Testing

(1) NIST Handbook 150 defines (Sec. 285.5) and describes (Sec. 285.22(4)) how proficiency testing is included in the accreditation process.

Note: NVLAP will perform proficiency testing when sufficient laboratories have enrolled such that it is economically feasible.

WBP test methods that require proficiency testing are identified by an asterisk in the Test Method Selection List (Appendix D). Proficiency testing is generally conducted twice a year. Laboratories renewing accreditation must have satisfactorily participated in all required proficiency testing during their previous accreditation period. Failure to participate is considered a deficiency and may result in suspension of accreditation.

(2) NVLAP conducts the proficiency testing for the WBP program through a proficiency testing contractor.

(3) Twice a year each laboratory is sent, (or is instructed to obtain), selected test samples, data sheets, and instructions for test specimen handling, preparation, conditioning, mounting, and testing. Proficiency testing may consist of several parts in order that the operation of a laboratory might be evaluated. Also, portions of the standard test procedure may be emphasized; e.g., measurement and instrumentation, hardware, and data analysis. Generally, it is required that the specific proficiency test procedure be conducted in

accordance with the applicable standard test method. At times NVLAP may specify special conditions to assure uniformity in procedures and test conditions among participants. Those may include the number of replicate measurements, special conditions of temperature and humidity, and other test parameters. ***The work must not be contracted out to another laboratory.*** Completed test results and data sheets must be returned to NVLAP, or the designated address, by the date specified on the data sheets. Failure to return the data sheets by the deadline may result in penalties which may include suspension of accreditation.

(4) On occasion, the on-site assessor hand carries proficiency test samples to the laboratory. These proficiency test samples, like all others received by the laboratory, are to be listed or entered into the normal sample tracking and identification system for control and data recording. In these cases, the samples may be returned to the on-site assessor rather than stored at the laboratory. Additionally, the laboratory may be instructed to send the samples back to the proficiency testing contractor, or to a destination specified by NVLAP or the proficiency testing contractor.

(5) After completion of a given proficiency test round, samples that are not returned to the on-site assessor or proficiency testing contractor become the property of the laboratory for use at its discretion. Experience has shown that these proficiency test samples are often useful to the laboratory as training artifacts, or as calibration-check samples. ***However, in no case shall these proficiency test samples be considered as calibration standards or standard reference materials and be used as substitutes for calibration standards that are traceable to national (i.e., NIST) or international standards laboratories***

(6) Proficiency test data are analyzed using statistical procedures to determine distributions and parameters, such as averages, standard deviations, and outliers. The results of the proficiency testing are reported to the participants in appropriate documents and reports. The identity and performance of individual laboratories remain confidential. Test data from proficiency testing must be used in monitoring the laboratory's own test performance.

The results of proficiency testing are made available to on-site assessors for use during laboratory assessment visits. If problems are indicated by proficiency testing, they are discussed with appropriate laboratory personnel responsible for developing and implementing plans for resolving the problems. After notification of unsatisfactory performance, the laboratory must take corrective action to resolve the deficiency in a timely manner, similar to the process for on-site assessment deficiency resolution. Failures may result in revocation or suspension of accreditation.

Sec. 285.23 Granting and renewing accreditation

Laboratories granted NVLAP accreditation are provided with two documents: a Certificate of Accreditation and a Scope of Accreditation. Samples of these accreditation documents for the WBP program are shown in Appendix A. Note that the certificate states that the criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987).

Sec. 285.33 Criteria for accreditation

(c) Quality system, audit and review

(1) Under its quality system, the laboratory shall implement policies and operational procedures covering all of the technical requirements in this handbook. Periodic reviews of the quality system shall reflect adherence to NVLAP requirements and the laboratory's quality objectives. These reviews should reflect positive aspects of the quality system as well as deficiencies.

Examples of operational procedures that must be included in the quality manual are:

(i) procedures for receipt, identification, and tracking of test samples;

(ii) procedures by which the laboratory describes the wood based products test samples and the criteria for their acceptance or rejection;

(iii) procedures for interlaboratory comparison and the laboratory's participation in proficiency testing, a summary of the results, and a description of any corrective actions taken because of the results; and

(iv) the personnel training and competency evaluations which demonstrate that the test procedures are being followed correctly.

(2) NIST Handbook 150, Sec. 285.33(c)(2) lists quality system requirements that must be included in the quality manual. In addition, the quality manual must contain or make reference to the location of procedures or testing manuals containing detailed descriptions of the procedures, practices, and equipment that the laboratory uses in conducting the test methods for which it seeks accreditation.

(3) During the on-site assessment, supporting documentation is to be made readily accessible to the NVLAP assessor. The assessor reviews the laboratory's own detailed procedures to perform tests of wood based products according to the standardized test procedures for which it seeks accreditation, the range of specimens it can test, and the descriptions of the maintenance and calibration of its specific equipment. Such descriptions may be prepared in a form convenient to the particular needs of the laboratory, but all the elements required by NVLAP procedures must be covered. The documentation must be readily accessible to the staff.

(4) The quality manual shall contain a description of the procedures that the laboratory uses to evaluate the uncertainty of its measurements using within-laboratory or replicate testing.

(5) The most recent publication of the standards for the test methods for which the laboratory is accredited shall be available as references and are to be followed in conducting the test procedures. The test methods that may be selected by the laboratory are listed in the Test Method Selection List (Appendix D).

(d) Personnel

(1) The laboratory shall maintain records on each staff member, including a résumé of qualifications; laboratory testing procedures to which the person is assigned; and the results of periodic testing performance reviews, which may include intra-operator tests and between-laboratory tests.

NOTE: For the purpose of on-site assessments, a separate personnel folder of information specific to applicable NVLAP requirements may be provided instead of the complete folder which may contain confidential information not needed for the assessment.

(2) The laboratory shall have a description of its training program for ensuring that staff are able to perform tests properly.

(3) The laboratory shall ensure that each new staff member is trained for the testing duties assigned and that staff members are retrained when they are assigned new responsibilities or when test methods are updated.

(4) The laboratory shall evaluate the competency of each staff member for each test method the staff member is authorized to conduct. An evaluation and observation of performance shall be conducted annually by the immediate supervisor, or a designee appointed by the laboratory director, and must be adequately documented. A record of the annual evaluation of each staff member must be dated and signed by the supervisor and the employee, and retained in the personnel file.

The following are examples of competency review items:

(i) general requirements of the test methods;

(ii) specimen preparation, dimensional measurements, mounting techniques;

(iii) environmental control apparatus;

(iv) environmental conditioning of specimens;

(v) calibration of test machines;

(vi) determination of moisture content and specific gravity;

(vii) calibration and reading of load/deformation/strain-recording equipment;

(viii) dimensional measuring devices;

(ix) automatic data logging and readout instrumentation;

(x) operation of fire performance test equipment;

(xi) thermocouple mounting and calibration;

(xii) characteristics of adhesives used to bond specimens;

(xiii) description of specimen and test setup;

(xiv) balances and scales for mass determination;

(xv) load application—continuous and at proper rate;

(xvi) description of progression of failure and failure mode;

(xvii) reading of percentage of wood failure;

(xviii) spectrophotometer (formaldehyde analysis);

(xix) spectrophotometer (treated-wood analyses); and

(xx) large chamber (formaldehyde).

(5) Reference documents, texts, and current scientific and industry periodicals shall be made available to all technical staff to keep their knowledge up to date.

(f) Equipment and reference materials

All facilities and equipment used for performing the applicable tests must conform with the requirements of the standard test methods. If, by modification, the equipment is different from that called for by the test method, the laboratory must provide evidence (e.g., comparative test results, round-robins, analytical or mathematical proof) that use of the modified equipment results in test data which are equivalent to what would be obtained by the test equipment specified in the test method.

The laboratory workspace and any environmentally controlled spaces (e.g., storage tanks, constant temperature-relative humidity rooms) will be checked for proper conditions, including monitoring devices.

The equipment used for conducting the tests in the WBP program shall be maintained and calibrated (or verified) in accordance with the manufacturer's recommendation, as specified in the test method, or as specified below, whichever results in shorter time periods between calibrations:

Apparatus/Instrumentation	*Calibration or Verification Frequency*
dimensional measuring devices	annually
drying ovens	annually
load cells and test machines	annually
scales and balances	annually
large chamber (formaldehyde)	annually
automatic data logging and readout	annually*
potentiometers	annually*
thermocouple and related instrumentation	annually*
thermostats	annually*
environmental conditioning units	quarterly
calorimeters	per test method
gas analyzers	per test method
photometers	per test method
smoke obscuration measuring system	per test method
transducers and dial gages	per test method
spectrophotometer	per test method

* If the calibration of the equipment is shown to vary due to the lack of modern solid-state electronics, then the entry under *Frequency* shall be 6 months.

(g) Measurement traceability and calibration

(1) The laboratory's calibrations may be performed by properly trained staff using calibrated standards, or through contract(s)

with a competent external calibration service. All calibrations and characterizations must be done against reference standards that are traceable to national standards maintained by NIST or by a foreign national standards authority that issues reference or calibration materials. It is the responsibility of the laboratory seeking accreditation to determine that, where appropriate, calibration services use reference standards traceable to NIST or a foreign national standards authority. The use of a NVLAP-accredited calibration laboratory fulfills the foregoing traceability requirement.

(2) Calibration certificates and records and evidence of the traceability of the reference standards used must be retained and made available for an assessor's inspection during the on-site visit. The calibration certificate should indicate uncertainty or accuracy limits, and traceability of reference standards. If calibration is performed by the laboratory, the standard metrological procedures used and the environmental conditions must be documented. Certificates are required for calibration performed by outside services; they are not required for all testing equipment.

The records for each calibration and test shall contain sufficient information to permit their repetition. The records shall include the identity of personnel involved in sampling, preparation, calibration or testing.

(3) In addition to the information specified in NIST Handbook 150, Sec. 285.33(f)(4), testing equipment or verification records shall include the following:

(i) notation of all equipment variables requiring verification;

(ii) the range of verification;

(iii) the resolution of the instrument and its allowable error;

(iv) identity of the laboratory individual or external service responsible for calibration; and

(v) source of reference standard and traceability.

(h) Calibration and test methods

(1) Laboratories must use the test procedures described in the standards given in the Test Method Selection List (Appendix D). In order to maintain the quality of the results of these standard tests, a laboratory must have written procedures for the laboratory personnel to follow when conducting the tests. These procedures should address any information not specifically contained in the standard method and any deviations used by the laboratory. These procedures should also include equipment operation, calibration checks, and quality control checks. The laboratory may use the specific standard test method procedure when determined suitable by a NVLAP assessor.

(2) Departures from test method procedures are permissible only for conditions based upon technical reasons and must be acceptable to the client. Departures from those procedures must be identified in detail in test reports. Data must be available to show that departures are equivalent to or improve the accuracy and/or precision of the measurement without compromising a given test. On-site assessors may only recommend acceptance of the departures to NVLAP but are not authorized to grant approval to the laboratories.

(3) ***Equivalency of test methods***

In the WBP accreditation program, the Canadian test methods are considered comparable to the U.S. counterparts for purposes of accreditation only (Appendix D). The Canadian test methods are not offered separately.

(j) Records

(1) Records may be kept in hard copy or computer form (with an adequate back-up system) and shall be readily accessible and secure. Entries in laboratory notebooks shall be dated and signed or initialed. Computer-based records must contain entries of pertinent staff/date information for data as required in the quality manual and means to preserve integrity for maintenance of records, without later modifications, as an established

safeguard. Records will be reviewed during the on-site assessment by selected sampling.

(2) The records to be maintained include:

(i) acceptance/rejection of samples of wood based products submitted for test;

(ii) comprehensive logs for tracking samples and test activities;

(iii) original data collected by the laboratory;

(iv) calibration and verification data;

(v) data and results of quality control;

(vi) equipment and maintenance records; and

(vii) test reports.

(3) Test records, sufficient to reconstruct test reports, shall be kept for a period of three years following the completion of testing, unless a longer period is required by the client, regulation, or the laboratory's own procedures.

(k) Certificates and reports

(1) All test reports must contain sufficient information for the exact test conditions to be reproduced at a later time if a retest is necessary. Reports intended for use only by the vendor may conform to vendor/laboratory contract obligations, but must be in accord with NVLAP requirements.

(2) In many cases, raw data collected by computer are collated, reduced, and analyzed for incorporation in the test report. The electronic transmission of the data and development of the test report is generally performed at the laboratory. However, at times, the report may be written at an adjunct facility that is located some distance from the testing laboratory. In such a case, the laboratory must have in place, procedures and documentation for assuring the quality and validity of the data transmission, and their incorporation in the test report.

If organizations use several departments for different testing functions, data collection, and data processing, it is necessary that lines of authority be defined and that no conflicts exist. The assessor will review these procedures and documentation during the on-site assessment, and also assure that all NVLAP procedures regarding the writing and storage of reports are followed. Depending upon the assessor's evaluations of the procedures, descriptions, and other documentation for assuring the validity of the data transmission and subsequent report writing, an assessment visit to the adjunct facility may be required. When warranted, the assessor will visit the adjunct facility at additional cost to the laboratory before accreditation is granted or renewed.

(m) Outside support services and supplies

The laboratory must verify or test incoming materials and supplies that affect the quality and accuracy of the test results. Examples include equipment vendors, general laboratory equipment, data processing and acquisition equipment, analytical grade reagents, and adhesives used in testing.

APPENDIX A

SAMPLE ACCREDITATION DOCUMENTS

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO/IEC GUIDE 58:1993
ISO 9002:1994

Certificate of Accreditation

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

LABORATORY NAME
ANYTOWN, USA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

WOOD BASED PRODUCTS

January 1, 19–
Effective until

Albert D. Tholen
For the National Institute of Standards and Technology

NVLAP LAB CODE: 0000

National Institute of Standards and Technology

NVLAP®

National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO/IEC GUIDE 58:1993
ISO 9002:1994

Scope of Accreditation

WOOD BASED PRODUCTS

NVLAP LAB CODE 0000

LABORATORY, INC.
Anytown, USA 00000-0000
John Doe Phone: 000-000-0000

NVLAP Code	*Designation*	*Short Title*
GENERAL-WOOD PRODUCTS		
23/G02	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials- Part A Sec. 11-20- Static Bending
FIRE TESTS		
23/F01	ASTM E84	Surface Burning Characteristics of Building Materials
FORMALDEHYDE		
23/T01	ASTM D1333	Determining Formaldehyde Levels From Wood Products Under Defined Test Conditions Using a Large Chamber
STRUCTURAL-USE PANELS		
23/S07	PS-2	Wood-Based Structural Use Panels-Sec. 6.4.1: Performance Under Concentrated Static and Impact Loads
STRUCTURAL COMPOSITE LUMBER, GLULAM, I-JOISTS		
23/J14	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T107: Shear Test

January 1, 19--

Effective until

For the National Institute of Standards and Technology

APPENDIX B

GENERAL OPERATIONS CHECKLIST

NVLAP LAB CODE: [ ]

GENERAL OPERATIONS CHECKLIST

Instructions to the Assessor: This checklist addresses general accreditation criteria prescribed in applicable sections of NIST Handbook 150, *NVLAP Procedures and General Requirements*.

This checklist follows and is numbered to correspond to the *NVLAP Procedures and General Requirements*, Subsection 285.33. The numbers in square brackets identify related checklist items. A small black triangle appears in the left-hand margin of selected lines of text throughout this checklist; the marked text applies only to the Calibration Laboratory Accreditation Program (LAP).

Place an "X" beside each checklist item which represents a deficiency. Place a "C" beside each item on which you are commenting for other reasons. Record the item number and your written deficiency explanations and/or comments in this list or on the attached comment sheets. Place a check beside all other items you observed or verified at the laboratory.

SEC. 285.33 CRITERIA FOR ACCREDITATION

(b) ***Organization and management***

(1) The laboratory shall be:

_____ (i) legally identifiable;

Legal name of laboratory ownership: _____

(ii) organized and shall operate in such a way that its permanent, temporary and mobile facilities meet the NVLAP requirements [see also (b)(2)(i), (c)(2)(ii)];

_____ (iii) properly identified on the NVLAP Application.

(2) The laboratory shall:

_____ (i) have managerial staff with the authority and resources needed to discharge their duties [see also (b)(1)(ii), (c)(2)(ii)];

_____ (ii) have policies to ensure that its personnel are free from any commercial, financial and other pressures which might adversely affect the quality of their work;

_____ (iii) be organized in such a way that confidence in its independence of judgment and integrity is maintained at all times;

_____ (iv) specify and document the responsibility, authority and interrelation of all personnel who manage, perform or verify work affecting the quality of calibrations and tests;

_____ (v) provide supervision by persons familiar with the calibration or test methods and procedures, the objective of the calibration or test, and the assessment of the results. The ratio of supervisory to non-supervisory personnel shall be such as to ensure adequate supervision;

_____ (vi) have a technical manager (however named) who has overall responsibility for the technical operations;

Name of person: _____

_____ (vii) have a quality manager (however named) who has responsibility for the quality system and its implementation. The quality manager shall have direct access to the highest level of management at which decisions are taken on laboratory policy or resources, and to the technical manager. In some laboratories, the quality manager may also be the technical manager or deputy technical manager;

Name of person: _____

_____ (viii) nominate deputy(ies) in case of absence of the technical or quality manager;

Name(s): _____

_____ (ix) have documented policy and procedures to ensure the protection of clients' confidential information and proprietary rights [see also (c)(2)(xviii)];

_____ (x) where appropriate, participate in interlaboratory comparisons and proficiency testing programs [see also (c)(2)(xiv), (c)(6)(ii), (g)(3)];

_____ (xi) have documented policy and procedures to ensure that its clients are served with impartiality and integrity.

(c) ***Quality system, audit and review***

(1) The laboratory shall:

_____ (i) have an established and maintained quality system appropriate to the type, range and volume of calibration and testing activities it undertakes;

_____ (ii) have the elements of the quality system documented;

_____ (iii) ensure that the quality documentation is available for use by the laboratory personnel;

_____ (iv) define and document its policies and objectives for, and its commitment to, good laboratory practice and quality of calibration or testing services;

_____ (v) have the laboratory management which ensures that these policies and objectives are documented in a quality manual and communicated to, understood, and implemented by all laboratory personnel concerned;

_____ (vi) ensure that the quality manual is maintained current under the responsibility of the quality manager [see also (c)(2)(iv)].

Date of quality manual: _____

Date of latest update: _____

(2) The quality manual, and related quality documentation, shall state the laboratory's policies and operational procedures established in order to meet the NVLAP requirements. The quality manual and related quality documentation shall contain:

_____ (i) a quality policy statement, including objectives and commitments, by top management;

_____ (ii) the organization and management structure of the laboratory, its place in any parent organization and relevant organizational charts;

_____ (iii) the relations between management, technical operations, support services and the quality system;

_____ (iv) procedures for control and maintenance of documentation [see also (c)(1)(vi), (j)(1)];

_____ (v) job descriptions of key staff and reference to the job descriptions of other staff;

_____ (vi) identification of the laboratory's approved signatories (list here or in the comments section): _____

_____

_____ (vii) the laboratory's procedures for achieving traceability of measurements;

_____ (viii) the laboratory's scope of calibrations and/or tests;

_____ (ix) written procedures for ensuring that the laboratory reviews all new work to ensure that it has the appropriate facilities and resources before commencing such work;

_____ (x) reference to the calibration, verification and/or test procedures used;

_____ (xi) procedures for handling calibration and test items;

_____ (xii) reference to the major equipment and reference measurement standards used;

_____ (xiii) reference to procedures for calibration, verification and maintenance of equipment;

_____ (xiv) reference to verification practices including interlaboratory comparisons, proficiency testing programs, use of reference materials and internal quality control schemes [see also (b)(2)(x), (c)(6)(ii), (g)(3)];

(xv) procedures to be followed for feedback and corrective action whenever:

_____ a) testing discrepancies are detected, or

_____ b) departures from documented policies and procedures occur;

_____ (xvi) the laboratory management policies for departures from documented policies and procedures or from standard specifications;

_____ (xvii) procedures for dealing with complaints [see also (n)];

_____ (xviii) procedures for protecting confidentiality and proprietary rights [see also (b)(2)(ix)];

_____ (xix) procedures for audit and review;

_____ (xx) a description of the laboratory's policy regarding the use of the NVLAP logo;

▸ _____ (xxi) a statement of the laboratory's policy for establishing and changing
▸ calibration intervals for equipment it controls; and

_____ (xxii) a statement of the laboratory's policy concerning the technique(s) to be used for determining measurement uncertainty and calibration/verification adequacy.

_____ (3) The laboratory shall arrange for audits of its activities at appropriate intervals to verify that its operations continue to comply with the requirements of the quality system. Such audits shall be carried out by trained and qualified staff who are, wherever possible, independent of the activity to be audited. Where the audit findings cast doubt on the correctness or validity of the laboratory's calibration or test results, the laboratory shall take immediate corrective action and shall immediately notify, in writing, any client whose work may have been affected.

The audits shall be objective and be conducted internally or on contract. The audits shall include both general criteria (documents, records and policies) and technical compliance (test methods and practices and calibration procedures).

_____ (4) The quality system adopted to satisfy the NVLAP requirements shall be reviewed at least once a year by the management to ensure its continuing suitability and effectiveness and to introduce any necessary changes or improvements.

_____ (5) All audit and review findings and any corrective actions that arise from them shall be documented. The person responsible for quality shall ensure that these actions are discharged within the agreed timescale.

(6) In addition to periodic audits the laboratory shall ensure the quality of results provided to clients by implementing checks. These checks shall be reviewed and shall include, as appropriate, but not be limited to:

_____ (i) internal quality control plans, such as control charts and other available statistical techniques;

NOTE: Measurement assurance techniques are acceptable means to control the measurement process and consistently produce the highest quality measurements.

_____ (ii) participation in proficiency testing or other interlaboratory comparisons [see also (b)(2)(x), (c)(2)(xiv), (g)(3)];

_____ (iii) regular use of certified reference materials and/or in-house quality control using secondary reference materials;

_____ (iv) replicate testings using the same or different methods;

_____ (v) retesting of retained items;

_____ (vi) correlation of results for different characteristics of an item.

(d) ***Personnel*** [see also (c)(2)(v)]

_____ (1) The testing laboratory shall have sufficient personnel, having the necessary education, training, technical knowledge and experience for their assigned functions.

_____ (2) The testing laboratory shall ensure that the training of its personnel is kept up-to-date.

_____ (3) Records on the relevant qualifications, training, skills and experience of the technical personnel shall be maintained by the laboratory.

(e) ***Accommodation (facilities) and environment*** [see also (i)(3)]

_____ (1) Laboratory accommodation, calibration and test areas, energy sources, lighting, heating and ventilation shall be such as to facilitate proper performance of calibrations or tests.

NOTE: Laboratory design will be, to the maximum extent practical, in accordance with the guidelines found in the NCSL Recommended Practice #7, *Laboratory Design*, July 25, 1993.

_____ (2) The environment in which these activities are undertaken shall not invalidate the results or adversely affect the required accuracy of measurement. Particular care shall be taken when such activities are undertaken at sites other than the permanent laboratory premises.

NOTE: It is expected that environments which do not meet generally accepted norms, such as those found in NCSL Recommended Practice #7, yet which exhibit the stability required to apply necessary correction factors, will be specified by the laboratory for the purpose of assessment of compliance with its own procedures to achieve its stated uncertainties.

_____ (3) The laboratory shall provide facilities for the effective monitoring, control and recording of environmental conditions as appropriate. Due attention shall be paid, for example, to biological sterility, dust, electromagnetic interference, humidity, voltage, temperature, and sound and vibration levels, as appropriate to the calibrations or tests concerned.

_____ (4) There shall be effective separation between neighboring areas when the activities therein are incompatible.

_____ (5) Access to and use of all areas affecting the quality of these activities shall be defined and controlled.

_____ (6) Adequate measures shall be taken to ensure good housekeeping in the laboratory.

NOTE: While it is the laboratory's responsibility to comply with relevant health and safety requirements, this is outside the scope of this assessment.

(f) ***Equipment and reference materials***

(1) The laboratory shall:

_____ (i) be furnished with all items of equipment (including hardware, software, and reference materials) required for the correct performance of calibrations and tests;

_____ (ii) in those cases where the laboratory needs to use equipment outside its permanent control, including rented, leased and client-owned equipment, ensure that the relevant NVLAP requirements are met.

_____ (2) All equipment shall be properly maintained. Maintenance procedures shall be documented. Any item of the equipment which has been subjected to overloading or mishandling, or which gives suspect results, or has been shown by verification or otherwise to be defective, shall be taken out of service, clearly identified and wherever possible stored at a specified place until it has been repaired and shown by calibration, verification or test to perform satisfactorily. The laboratory shall examine the effect of this defect on previous calibrations or tests.

_____ (3) Each item of equipment including reference materials shall, when appropriate, be labelled, marked or otherwise identified to indicate its calibration status.

_____ (4) Records shall be maintained of each item of equipment and all reference materials significant to the calibrations or tests performed. The records shall include:

_____ (i) the name of the item of equipment, software or reference material;

_____ (ii) the manufacturer's name, type identification, and serial number or other unique identification;

_____ (iii) date received and date placed in service;

NOTE: For initial accreditation, the date received and the date placed in service are not considered mandatory requirements for inclusion in laboratory records, although this is encouraged as good laboratory practice.

_____ (iv) current location, where appropriate;

_____ (v) condition when received (e.g., new, used, reconditioned);

_____ (vi) copy of the manufacturer's instructions, where available;

_____ (vii) dates and results of calibrations and/or verifications and date of next calibration and/or verification;

_____ (viii) details of maintenance carried out to date and planned for the future;

_____ (ix) history of any damage, malfunction, modification or repair;

► _____ (x) measured value observed for each parameter found to be out of tolerance
► during calibration/verification.

(g) ***Measurement traceability and calibration***

_____ (1) All measuring and testing equipment having an effect on the accuracy or validity of calibrations or tests shall be calibrated and/or verified before being put into service. The laboratory shall have an established program for the calibration and verification of its measuring and test equipment. The program will ensure the recall or removal from service of any standard or equipment which has exceeded its calibration interval or is otherwise judged to be unreliable.

_____ (2) The overall program of calibration and/or verification and validation of equipment shall be designed and operated so as to ensure that, wherever applicable, measurements made by the laboratory are traceable to national standards of measurement where available. Calibration certificates shall, wherever applicable, indicate the traceability to national standards of measurement and shall provide the measurement results and associated uncertainty of measurement and/or a statement of compliance with an identified metrological specification.

NOTE: Traceability to national standards includes traceability to standards maintained or defined at national laboratories in foreign countries where applicable. In these cases, traceability is achieved via international standards. This includes intrinsic standards of measurement where available.

Where applicable, the methodology of the *Guide to the expression of uncertainty in measurement*: 1993, shall be used as the basis for expression of uncertainty of the measurement. NIST Technical Note 1297; January 1993, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, is a practical application document written around the *Guide to the expression of uncertainty in measurement*. Where detailed procedures are not used to quantify and combine uncertainties (i.e., use of test accuracy ratio concepts), the sources of uncertainty shall be tabulated and demonstrated to be acceptable for the measurement undertaken.

NOTE: A significant number of intrinsic standards, such as the Josephson Array Voltage Standard and the Iodine-Stabilized Helium-Neon Laser Length Standard, have been developed and are now being used by many national standards laboratories and some industrial laboratories. These standards are based on well-characterized laws of physics, fundamental constants of nature, or invariant properties of materials, and make ideal stable, precise, and accurate measurement standards if properly designed, characterized, operated, monitored and maintained. Where intrinsic standards are used, the laboratory should demonstrate by measurement assurance techniques, interlaboratory comparisons, or other suitable means, that its intrinsic standard measurement results are correlated with those of national or international standards.

_____ (3) Where traceability to national standards of measurement is not applicable, the laboratory shall provide satisfactory evidence of correlation of results, for example by participation in a suitable program of interlaboratory comparisons or proficiency testing [see also (b)(2)(x), (c)(2)(xiv), (c)(6)(ii)].

NOTE: Traceability requirements may also be satisfied by:

(i) internationally accepted standards in the field concerned;

(ii) suitable reference materials;

(iii) ratio or reciprocity measurements; or

(iv) mutual consent standards which are clearly specified and mutually agreed upon by all parties concerned.

_____ (4) Reference standards of measurement held by the laboratory shall be used for calibration only and for no other purpose, unless it can be demonstrated that their performance as reference standards has not been invalidated.

_____ (5) Reference standards of measurement shall be calibrated by a body that can provide traceability to a national standard of measurement. There shall be a program of calibration and verification for reference standards.

_____ (6) Where relevant, reference standards and measuring and testing equipment shall be subjected to in-service checks between calibrations and verifications.

_____ (7) Reference materials shall, where possible, be traceable to national or international standards of measurement, or to national or international standard reference materials.

(h) ***Calibration and test methods***

_____ (1) The laboratory shall have documented instructions on the use and operation of all relevant equipment, on the handling and preparation of items and for calibration and/or testing, where the absence of such instructions could jeopardize the calibrations or tests. All instructions, standards, manuals and reference data relevant to the work of the laboratory shall be maintained up-to-date and be readily available to the staff.

_____ (2) The laboratory shall use appropriate methods and procedures for all calibrations and tests and related activities within its responsibility (including sampling, handling, transport and storage, preparation of items, estimation of uncertainty of measurement and analysis of calibration and/or test data). They shall be consistent with the accuracy required, and with any standard specifications relevant to the calibrations or tests concerned.

NOTES:

(i) Calibration procedures shall contain the required range and tolerance or uncertainty of each item or unit parameter being calibrated or verified. In addition, the procedures shall contain the generic description of the measurement standards and equipment needed with the required parameter, range, tolerances or uncertainties, and specifications for performing the measurement of the calibration or verification, and/or representative types (manufacturer, model, option) that are capable of meeting the generic description for the measurement standards. The procedures shall be consistent with the accuracy required, and with any standard specifications relevant to the calibrations/verifications concerned.

(ii) The laboratory shall ensure that the calibration uncertainties are sufficiently small so that the adequacy of the measurement is not affected. Well-defined and documented measurement assurance techniques or uncertainty analyses may be used to verify the adequacy of a measurement process. If such techniques are not used, then the collective uncertainty of the measurement standards shall not exceed 25% of the acceptable tolerance (e.g., manufacturer's specification) for each characteristic of the measuring and test equipment being calibrated or verified.

_____ (3) Where methods are not specified, the laboratory shall, wherever possible, select methods that have been published in international or national standards, those published by reputable technical organizations or in relevant scientific texts or journals.

_____ (4) Where it is necessary to employ methods that have not been established as standard, these shall be subject to agreement with the client, be fully documented and validated, and be available to the client and other recipients of the relevant reports [see also (k)(2)(x)].

_____ (5) Where sampling is carried out as part of the test method, the laboratory shall use documented procedures and appropriate statistical techniques to select samples [see also (k)(2)(ix)].

_____ (6) Calculations and data transfers shall be subject to appropriate checks.

(7) Where computers or automated equipment are used for the capture, processing, manipulation, recording, reporting, storage or retrieval of calibration or test data, the laboratory shall have written procedures which ensure that:

_____ (i) the NVLAP requirements are complied with;

_____ (ii) computer software, computers or automated equipment is documented and adequate for use;

_____ (iii) procedures are established and implemented for protecting the integrity of data; such procedures shall include, but not be limited to, integrity of data entry or capture, data storage, data transmission and data processing;

_____ (iv) computer and automated equipment is maintained to ensure proper functioning and provided with the environmental and operating conditions necessary to maintain the integrity of calibration and test data [see also (f)(1)];

_____ (v) it establishes and implements appropriate procedures for the maintenance of security of data including the prevention of unauthorized access to, and the unauthorized amendment of, computer records.

_____ (8) Documented procedures shall exist for the purchase, reception and storage of consumable materials used for the technical operations of the laboratory [see also (m)(2)].

(i) ***Handling of calibration and test items***

_____ (1) The laboratory shall have a documented system for uniquely identifying the items to be calibrated or tested, to ensure that there can be no confusion regarding the identity of such items at any time [see also (k)(2)(v)].

_____ (2) Upon receipt, the condition of the calibration or test item, including any abnormalities or departures from standard condition as prescribed in the relevant calibration or test method, shall be recorded. Where there is any doubt as to the item's suitability for calibration or test, where the item does not conform to the description provided, or where the calibration or test required is not fully specified, the laboratory shall consult the client for further instruction before proceeding. The laboratory shall establish whether the item has received all necessary preparation, or whether the client requires preparation to be undertaken or arranged by the laboratory.

_____ (3) The laboratory shall have documented procedures and appropriate facilities to avoid deterioration or damage to the calibration or test item, during storage, handling, preparation, and calibration or test; any relevant instructions provided with the item shall be followed. Where items have to be stored or conditioned under specific environmental conditions, these conditions shall be maintained, monitored and recorded where necessary. Where a calibration or test item or portion of an item is to be held secure (for example, for reasons of record, safety or value, or to enable check calibrations or tests to be performed later), the laboratory shall have storage and security arrangements that protect the condition and integrity of the secured items or portions concerned [see also (e)].

_____ (4) The laboratory shall have documented procedures for the receipt, retention or safe disposal of calibration or test items, including all provisions necessary to protect the integrity of the laboratory.

_____ (5) Tamper-resistant seals shall be affixed to operator-accessible controls or adjustments on measurement standards or measuring and test equipment which, if moved, will invalidate the calibration. The laboratory's calibration system shall provide instructions for the use of such seals and for the disposition of equipment with damaged or broken seals.

NOTE: Tamper-resistant seals are sometimes affixed to equipment to prevent unauthorized access to areas where adjustments or critical components are located.

(j) *Records*

_____ (1) The laboratory shall maintain a record system to suit its particular circumstances and comply with any applicable regulations. It shall retain on record all original observations, calculations and derived data, calibration records and a copy of the calibration certificate, test certificate or test report for an appropriate period. The records for each calibration and test shall contain sufficient information to permit their repetition. The records shall include the identity of personnel involved in sampling, preparation, calibration or testing [see also (c)(2)(iv)].

▸ **EXCEPTION:** The retention of all original observations, calculations, and
▸ derived data in the calibration record system is not a mandatory requirement
▸ for calibration laboratories, although it is encouraged as good laboratory
▸ practice.

_____ (2) All records (including those listed in (f)(4) pertaining to calibration and test equipment), certificates and reports shall be safely stored, held secure and in confidence to the client [see also (b)(2)(ix), (c)(2)(xviii)].

NOTE: The period of retention shall be specified in the quality manual.

Record retention time specified: _____

(k) ***Certificates and reports***

_____ (1) The results of each calibration, test, or series of calibrations or tests carried out by the laboratory shall be reported accurately, clearly, unambiguously and objectively, in accordance with any instructions in the calibration or test methods. The results should normally be reported in a calibration certificate, test report or test certificate and should include all the information necessary for the interpretation of the calibration or test results and all information required by the method used [see also (k)(4)(i)].

NOTE: It is recognized that the results of each calibration do not always result in the production of a calibration certificate or report. Whenever a certificate or report is produced, the above requirements shall be met.

(2) Each certificate or report shall include at least the following information:

_____ (i) a title, e.g., "Calibration Certificate," "Test Report" or "Test Certificate";

_____ (ii) name and address of laboratory, and location where the calibration or test was carried out if different from the address of the laboratory;

_____ (iii) unique identification of the certificate or report (such as serial number) and of each page, and the total number of pages;

_____ (iv) name and address of client, where appropriate;

_____ (v) description and unambiguous identification of the item calibrated or tested [see also (i)(1)];

_____ (vi) characterization and condition of the calibration or test item;

_____ (vii) date of receipt of calibration or test item and date(s) of performance of calibration or test, where appropriate;

EXCEPTION: Although it is encouraged as good laboratory practice, the requirement for inclusion of the date received is not mandatory for calibration laboratories.

_____ (viii) identification of the calibration or test method used, or unambiguous description of any non-standard method used;

_____ (ix) reference to sampling procedure, where relevant [see also (h)(5)];

_____ (x) any deviations from, additions to or exclusions from the calibration or test method, and any other information relevant to a specific calibration or test, such as environmental conditions [see also (c)(2)(xv), (h)(4)];

_____ (xi) measurements, examinations and derived results, supported by tables, graphs, sketches and photographs as appropriate, and any failures identified;

_____ (xii) a statement of the estimated uncertainty of the calibration or test result, where relevant;

_____ (xiii) a signature and title, or an equivalent identification of the person(s) accepting responsibility for the content of the certificate or report (however produced), and date of issue [see also (c)(2)(vi)];

_____ (xiv) where relevant, a statement to the effect that the results relate only to the items calibrated or tested;

_____ (xv) a statement that the certificate or report shall not be reproduced except in full, without the written approval of the laboratory;

_____ (xvi) a statement that the report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government;

_____ (xvii) the signature of an approved signatory for all test and calibration reports endorsed with the NVLAP logo;

▸ _____ (xviii) special limitations of use; and

▸ _____ (xix) traceability statement.

_____ (3) Where the certificate or report contains results of calibrations or tests performed by subcontractors, these results shall be clearly identified [see also (l)].

_____ (4) Particular care and attention shall be paid to the arrangement of the certificate or report, especially with regard to presentation of the calibration or test data and ease of assimilation by the reader. The format shall be carefully and specifically designed for each type of calibration or test carried out, but the headings shall be standardized as far as possible [see also (k)(1)].

_____ (5) Material amendments to a calibration certificate, test report or test certificate after issue shall be made only in the form of a further document, or data transfer including the statement "Supplement to Calibration Certificate (or Test Report or Test Certificate), serial number ... (or as otherwise identified)," or equivalent form of wording. Such amendments shall meet all the relevant requirements of item (j).

_____ (6) The laboratory shall notify clients promptly, in writing, of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any calibration certificate, test report, or test certificate or amendment to a report or certificate.

NOTE: Such notification shall quantify the magnitude of error created in the calibration results. The laboratory shall notify customers promptly, in writing, of any customer's measuring and test equipment found significantly out of tolerance during the calibration/verification process. Measurement data shall be reported so that appropriate action can be taken.

_____ (7) The laboratory shall ensure that, where clients require transmission of calibration or test results by telephone, telex, facsimile or other electronic or electromagnetic means, staff will follow documented procedures that ensure that the NVLAP requirements are met and that confidentiality is preserved.

_____ (8) Whenever a laboratory accredited by NVLAP issues a calibration or test report which contains data covered by the accreditation and also data not covered by the accreditation, it must clearly identify in its records, and in the report to the client, specifically which calibration or test method(s), or portion of a calibration or test method(s), was not covered by the accreditation. The laboratory must also inform the client, before the fact, when calibrations or tests requested are not covered by the accreditation.

NVLAP policy regarding calibration and test reports issued by an accredited laboratory, which reference the laboratory's accredited status, requires that any calibration or test report containing data from calibrations or tests which are not covered by the accreditation include:

_____ (i) a statement at the beginning of the report prominently indicating, "This report contains data which are not covered by the NVLAP accreditation"; and

_____ (ii) a clear indication of which data are not covered by the accreditation.

The laboratory must not misrepresent its accreditation. When a client requires or requests accredited services and any of the requested services are not covered by the accreditation, the client must be so advised.

(l) ***Subcontracting of calibration or testing*** [see also (k)(3)]

_____ (1) Where a laboratory subcontracts any part of the calibration or testing, this work shall be placed with a laboratory complying with these requirements. The laboratory shall ensure and be able to demonstrate that its subcontractor is competent to perform the activities in question and complies with the same criteria of competence as the laboratory in respect of the work being subcontracted. The laboratory shall advise the client in writing of its intention to subcontract any portion of the testing to another party.

_____ (2) The laboratory shall record and retain details of its investigation of the competence and compliance of its subcontractors and maintain a register of all subcontracting.

_____ (3) A NVLAP-accredited laboratory intending to subcontract testing or calibration work that will be performed and reported as meeting NVLAP procedures and criteria must:

_____ (i) have in its quality manual a subcontracting policy compatible with the NVLAP policy, with a description of the procedures for administering and implementing those actions to demonstrate the conformance and consistency of the subcontracted laboratory to perform according to NVLAP procedures;

_____ (ii) place the subcontracted work with a laboratory that maintains accreditation established by NVLAP shown by a current NVLAP Lab Code, or provide and maintain current records that demonstrate that the subcontracted laboratory is competent to perform the test(s) or calibration(s) and that it operates in a manner consistent with and in conformance to NVLAP criteria for accreditation;

_____ (iii) clearly identify in its records, and in the report to the client, exactly which data were obtained by the NVLAP-accredited laboratory and which data were obtained by the subcontractor, NVLAP-accredited or not;

_____ (iv) inform its client, before the fact, that it intends to subcontract for completion of all or a portion of the client's work; and

_____ (v) include at the beginning of the report the name, address, and contact person of the subcontracted laboratory(ies), and one of the following statements, as appropriate:

if NVLAP-accredited

"This report contains data which were produced by a subcontracted laboratory **ACCREDITED (NVLAP LAB CODE)** for the calibration or test methods performed"

if not NVLAP-accredited

"This report contains data which were produced by a subcontracted laboratory **NOT ACCREDITED** for the calibration or test methods performed."

The requirements of this section do not supersede any regulation, law, contract specification, or other related conditions which require NVLAP accreditation.

(m) ***Outside support services and supplies***

_____ (1) Where the laboratory procures outside services and supplies in support of calibrations or tests, the laboratory shall use only those outside support services and supplies that are of adequate quality to sustain confidence in the laboratory's calibrations or tests.

_____ (2) Where no independent assurance of the quality of outside support services or supplies is available, the laboratory shall have procedures to ensure that purchased equipment, materials and services comply with specified requirements. The laboratory should, wherever possible, ensure that purchased equipment and consumable materials are not used until they have been inspected, calibrated or otherwise verified as complying with any standard specifications relevant to the calibrations or tests concerned [see also (h)(8)].

_____ (3) The laboratory shall maintain records of all suppliers from whom it obtains support services or supplies required for calibrations or tests.

(n) ***Complaints*** [see also (c)(2)(xvii)]

_____ (1) The laboratory shall have documented policy and procedures for the resolution of complaints received from clients or other parties about the laboratory's activities. A record shall be maintained of all complaints and of the actions taken by the laboratory.

_____ (2) Where a complaint, or any other circumstance, raises doubt concerning the laboratory's compliance with the laboratory's policies or procedures, or with the NVLAP requirements or otherwise concerning the quality of the laboratory's calibrations or tests, the laboratory shall ensure that those areas of activity and responsibility involved are promptly audited in accordance with item (c)(3).

(o) ***Measuring and test equipment (M & TE)***

NOTE: This section applies to the control of measuring and test equipment (M & TE) used to assure that supplies and services comply with prescribed customer requirements. It is based in large part on the requirements found in government audit standards such as MIL-STD 45662A, and is found in Part II of the ANSI/NCSL Z540-1-1994 (Draft) standard.

(1) General requirements for M & TE

_____ (i) The supplier shall establish and document a system to control the calibration/verification of M & TE.

_____ (ii) M & TE used to determine compliance with customer technical specifications shall be calibrated or verified in accordance with sections 285.33(b) through (n).

_____ (iii) The supplier shall have a program to recall for calibration or verification, or remove from service, M & TE that has exceeded its calibration interval, has broken calibration seals, or is suspected to be malfunctioning because of mishandling, misuse, or unusual results.

_____ (iv) All operations performed by the supplier in compliance with these requirements shall be subject to customer verification at unscheduled intervals.

_____ (v) The supplier shall carry out, or arrange to have carried out, periodic quality auditing of the calibration and verification system in order to ensure its continuing effective implementation and compliance with these requirements.

()
Based on the results of the audits and any other relevant factors, such as customer feedback, the supplier shall review and modify the system as necessary.

- Plans and procedures for the audits shall be documented. The conduct of the audit and any subsequent corrective action shall also be documented.

(2) Detailed requirements for M & TE

_____ (i) Calibration system description: The supplier shall provide and maintain a written description of the calibration/verification system covering M & TE and measurement standards. The description shall be sufficient to satisfy each requirement of section 285.33(o) and any deviations shall be submitted with supporting documentation to the customer for approval.

_____ (ii) Adequacy of measurement standards: Measurement standards used by the supplier for calibrating M & TE and other measurement standards shall comply with the requirements of items (f)(1), (g)(1), and (h)(2).

_____ (iii) Environmental conditions: M & TE shall be used in an environment controlled to the extent necessary to ensure valid results. Due consideration shall be given to temperature, humidity, lighting, vibration, dust control, cleanliness, electromagnetic interference and any other factors affecting the results of measurements. Where pertinent, these factors shall be monitored and recorded and, when appropriate, correcting compensations shall be applied to measurement results.

_____ (iv) Intervals of calibration and verification: M & TE requiring calibration shall be calibrated or verified at periodic intervals established and maintained to assure acceptable reliability, where reliability is defined as the probability that M & TE will remain in-tolerance throughout the interval. Intervals shall be established for all M & TE requiring calibration unless the equipment is regularly monitored through the use of check standards in a documented measurement assurance process. Check standards must closely represent the item parameters normally tested in the process and the check standard must be verified periodically. Where intervals are used to ensure reliability, the interval setting system must be systematically applied and shall have stated reliability goals and a method of verifying that the goals are being attained. Intervals may be based on usage or time since last calibration or verification. All exemptions from periodic calibration or verification shall be documented. The recall system may provide for the temporary extension of the calibration due date for limited periods of time under specified conditions that do not unreasonably impair the satisfaction of the customer's requirements.

_____ (v) Calibration procedures: Procedures used to calibrate/verify the supplier's M & TE shall comply with the requirements of items (h)(1) and (h)(2).

_____ (vi) Out-of-tolerance conditions: If any M & TE is found to be significantly out of tolerance during the calibration/verification process, the supplier's system shall provide for notification to the user and to the supplier's quality element, if appropriate, of the out-of-tolerance condition with the associated measurement data so that appropriate action can be taken.

_____ (vii) Adequacy of calibration system: The supplier shall establish and maintain documented procedures to evaluate the adequacy of the calibration system and to ensure compliance with these requirements.

_____ (viii) Calibration sources: M & TE requiring calibration shall be calibrated or verified by laboratories that comply with sections 285.33(b) through (n).

_____ (ix) Records: These requirements shall be supported by records documenting that established schedules and procedures are followed to maintain the adequacy of all M & TE. The records for M & TE requiring calibration shall include an individual record of calibration or verification, or other means of control, providing a description or identification of the item, calibration interval, date calibrated, identification of the calibration source, calibration results (data and/or condition status) and calibration action taken (adjusted, repaired, new value assigned, derated, etc.).

_____ (x) Calibration status: M & TE shall be labeled to indicate calibration or verification status. The label shall identify specific date calibrated (day, month, year, Julian date, or equivalent) and the specific calibration due date or usage equivalent. Items not calibrated to their full capability or which have other limitations of use, shall be labeled or otherwise identified as to the limitations. When it is impractical to apply a label directly to an item, the label may be affixed to the instrument container or some other suitable means may be used to reflect calibration status. Tamper-resistant seals are affixed to operator accessible controls or adjustments which if moved will invalidate the calibration. The quality system shall provide instructions for the disposition of equipment with broken tamper-resistant seals.

_____ (xi) Control of subcontractor calibration: The supplier is responsible for assuring that the subcontractor's calibration system conforms to section 285.33 (l) to the degree necessary to assure compliance with contractual requirements. NVLAP accreditation of the subcontractor's laboratory can serve as the basis for compliance with this requirement.

_____ (xii) Storage and handling: M & TE shall be handled, stored, and transported in a manner which shall not adversely affect the calibration or condition of the equipment.

NVLAP LAB CODE: ____

GENERAL OPERATIONS CHECKLIST - COMMENTS AND DEFICIENCIES

Instructions to the Assessor: Use this sheet to document comments and deficiencies. For each, identify the appropriate item number from the checklist. Identify comments with a "C" and deficiencies with an "X." If additional space is needed, make copies of this page (or use additional blank sheets).

Item No.	*Comments and/or Deficiencies*

NVLAP LAB CODE: ____

GENERAL OPERATIONS CHECKLIST - COMMENTS AND DEFICIENCIES

Instructions to the Assessor: Use this sheet to document comments and deficiencies. For each, identify the appropriate item number from the checklist. Identify comments with a "C" and deficiencies with an "X." If additional space is needed, make copies of this page (or use additional blank sheets).

Item No.	*Comments and/or Deficiencies*

APPENDIX C

SPECIFIC OPERATIONS CHECKLIST

NVLAP LAB CODE: _____

SPECIFIC OPERATIONS CHECKLIST

WOOD BASED PRODUCTS

Instructions to the Assessor: The checklist addresses specific accreditation criteria prescribed in Section 285.33, *Criteria for Accreditation*, of the Wood Based Products (WBP) Program Handbook. Included also are instructions and comments sheets used for observing actual demonstrations of the performance of selected test methods. These criteria **do not** supersede the *Criteria for Accreditation*, based on Section 285.33 of the *NVLAP Procedures and General Requirements* (NIST Handbook 150), which are addressed in the GENERAL OPERATIONS CHECKLIST.

Place an "X" beside any of the following items which represent a deficiency. Place a "C" beside each item on which you are commenting for other reasons. Record the item number and your deficiency explanation and/or comments on the appropriate comment sheet(s). Place a check beside all other items you observed or verified at the laboratory.

1 QUALITY SYSTEM

_____ 1.1 The quality manual provides detailed procedures, including descriptions of equipment, that the laboratory follows in conducting physical, mechanical, and chemical measurements on the different wood and wood-based products for which it seeks accreditation.

_____ 1.2 The quality manual lists the range (e.g., size, shape, density, and property level) of test specimens that a laboratory can test for each test method for which accreditation is sought.

_____ 1.3 The quality manual describes practices for maintenance and calibration of the equipment used in conducting the tests on wood and wood-based products.

2 PERSONNEL

Personnel competency for Wood Based Products testing includes applicable portions of the following, as a minimum:

_____ 2.1 general requirements of the test methods;

_____ 2.2 specimen preparation, dimensional measurements, mounting techniques;

_____ 2.3 environmental conditioning of specimens;

_____ 2.4 calibration of test machines;

_____ 2.5 determination of moisture content and specific gravity;

_____ 2.6 calibration and reading of load/deformation/strain-recording equipment;

_____ 2.7 operation of fire performance test equipment;

_____ 2.8 thermocouple mounting and calibration;

_____ 2.9 characteristics of adhesives used to bond specimens;

_____ 2.10 description of specimen and test setup;

_____ 2.11 balances and scales for mass determination;

_____ 2.12 load application—continuous and at proper rate;

_____ 2.13 description of progression of failure and failure mode;

_____ 2.14 reading of percentage of wood failure;

_____ 2.15 spectrophotometer (formaldehyde analysis);

_____ 2.16 spectrophotometer (treated-wood analysis); and

_____ 2.17 large chamber (formaldehyde).

3 CALIBRATION AND TEST METHODS

3.1 Laboratory Operations and Test Standards

_____ 3.1.1 Samples and test specimens are uniquely identified for correlation with related records.

_____ 3.1.2 Test data forms (as required by the reference standard or developed in-house) are properly completed.

_____ 3.1.3 The laboratory maintains a dated log book or record for the tests it performs.

_____ 3.1.4 Measurement equipment is appropriate for the test method.

_____ 3.1.5 The test method(s) is performed correctly.

_____ 3.1.6 The latest version of the test standards for which the laboratory seeks accreditation are available.

3.2 Calibration Requirements

Specific calibration requirements for the WBP program are:

- in accordance with the manufacturer's recommendation;
- the test method; or
- as specified in the following table;

whichever results in shorter time periods between calibrations.

Apparatus/Instrumentation	*Calibration or Verification Frequency*
dimensional measuring devices	annually
drying ovens	annually
load cells and test machines	annually
scales and balances	annually
large chamber (formaldehyde)	annually
automatic data logging and readout	annually*
potentiometers	annually*
thermocouple and related instrumentation	annually*
thermostats	annually*
environmental conditioning units	quarterly
calorimeters	per test method
gas analyzers	per test method
photometers	per test method
smoke obscuration measuring system	per test method
transducers and dial gages	per test method
spectrophotometer	per test method

* If the calibration of the equipment is shown to vary due to the lack of modern solid-state electronics, then the entry under *Frequency* shall be 6 months.

3.3 Mechanical and Physical Properties

_____ 3.3.1 Samples are properly prepared, environmentally conditioned (including proper moisture content), handled, and maintained before testing.

_____ 3.3.2 Measurements of specimen dimensions and mass are accurately determined; descriptions of important sample characteristics are recorded when required.

_____ 3.3.3 Test equipment, devices, and instruments meet the requirements and are properly calibrated (and meet calibration conditions).

_____ 3.3.4 Test(s) are conducted within the specified temperature, humidity, and/or air flow conditions.

_____ 3.3.5 Wood and wood-based products are tested in the specified orientation, if any, and with proper test setup.

_____ 3.3.6 For mechanical testing, proper rate of load, strain, or deformation applied to specimen.

_____ 3.3.7 For the physical and mechanical measurements, test reports adequately describe the procedures and equipment, and where appropriate, failure mode and characteristics.

3.4 Formaldehyde Tests

3.4.1 The laboratory:

_____ a. maintains and verifies low levels of formaldehyde in storage and test areas;

_____ b. monitors temperature and relative humidity, as required during conditioning and testing of the wood-based specimens;

_____ c. has a chamber(s) that is properly constructed, calibrated, and maintained for conducting formaldehyde-emission tests;

_____ d. has a desiccator(s) of adequate size for conducting formaldehyde-emission tests;

_____ e. has perforator apparatus with all the necessary components for conducting formaldehyde-emission tests;

_____ f. seals desiccators with vacuum grease; and

_____ g. has necessary spectrophotometers, glassware, reagents, and other related apparatus for conducting formaldehyde analyses.

3.4.2 Test specimens:

_____ a. have the specified dimensions; and

_____ b. have proper edge-coating with paraffin wax where required.

3.4.3 The laboratory:

_____ a. conditions and exposes specimens for the required length of time;

_____ b. dries specimens to constant mass before formaldehyde-emission tests are conducted where required;

_____ c. places specimens in chambers or desiccators such that all surfaces are freely exposed;

_____ d. cleans glassware using specified cleaning solutions;

_____ e. uses analytical grade reagents, as specified;

_____ f. uses freshly prepared standard formaldehyde solutions;

_____ g. adds sulfuric acid to analysis solutions such that splattering does not occur;

_____ h. standardizes the spectrophotometer at the appropriate wavelength (i.e., 412 or 580 nm);

_____ i. prepares formaldehyde concentration-UV absorbance calibration curves according to the procedure given in specified test method;

_____ j. assures that formaldehyde determinations on phenol-formaldehyde products have no interference from phenol; and

_____ k. conducts additional formaldehyde determinations when replicate analyses differ by more than the specified allowable limits.

3.5 Analysis of Treated Wood Products

3.5.1 Where required by the test method, the laboratory:

_____ a. has apparatus with all the necessary components for specimen extraction;

_____ b. has equipment with all the necessary components for specimen ignition;

_____ c. has the necessary equipment for preparing pellets for XRF analysis; and

_____ d. has a properly calibrated spectrophotometer (atomic absorption or XRF) for conducting the analysis.

3.5.2 The laboratory:

_____ a. uses a vented oven for drying specimens, when specified;

_____ b. uses a microwave oven for drying samples, only if it has established that error is not introduced into the analysis due to the microwave drying; and

_____ c. has necessary glassware, reagents, and other related apparatus for conducting the analyses.

3.5.3 Test specimens:

_____ a. are dried as required and, upon drying, are handled such that they do not pick up moisture before testing; and

_____ b. are prepared to have the proper mass, volume, size, shape, density, or concentration as specified in the individual test method.

3.5.4 The laboratory:

_____ a. performs the analytical methods correctly, and applies them to specimens that have the elements or constituents under analysis within the concentration range specified in the standard;

_____ b. only conducts chloride determinations (AWPA A5) on samples that contain no halogens other than chlorine unless appropriate correction is properly made;

_____ c. assures that standard solutions used for wet chemical and instrumental analyses are prepared to the required concentrations;

_____ d. assures the correct concentration of standardized solutions and checks that they have not changed in concentration before use;

_____ e. prepares calibration curves for spectrophotometric analyses (atomic absorption or XRF) according to the procedure given in specified test method;

_____ f. verifies that calibration curves for spectrophotometric analyses have not changed during the analyses;

_____ g. has procedures to assure that, when conducting spectrophotometric tests, interferences are not affecting the analytical results;

_____ h. cleans and assembles glassware (e.g., extraction apparatus) as required;

_____ i. uses reagent grade chemicals and reagent purity or deionized water, as specified;

_____ j. uses high purity gases, and proper flame conditions and light sources when conducting atomic absorption spectrophotometry;

_____ k. conducts extraction or ignition procedures correctly using specified times and temperatures, when performing tests incorporating these procedures; and

_____ l. detects end-points properly when performing titrations.

APPENDIX D

TEST METHOD SELECTION LIST

NVLAP LAB CODE: ____

WOOD BASED PRODUCTS
TEST METHOD SELECTION LIST

Instructions: Check each test method for which you are requesting accreditation.

An asterisk (*) or a double asterisk (**) beside the NVLAP Test Method Code indicates that proficiency testing is required. The double asterisk indicates test methods which require visual estimates of percent wood failure. The double-asterisk test methods will be conducted similar to the other proficiency testing; however, since quantified measurements are unavailable, only relative comparisons can be made.

Notification will be given for the required proficiency testing by NVLAP and/or a NVLAP contractor, and the results of both types of proficiency testing will be reported in a single Tech Brief or in separate Tech Briefs.

Test Method Designations in parentheses indicate Canadian test methods. These test methods were found comparable for purposes of accreditation only (see Sec. 285.33(h)(3) of the Wood Based Products program handbook).

GENERAL WOOD PRODUCTS

To avoid duplication in the list of test methods within each category, the GENERAL WOOD PRODUCTS listing represents those methods which would appear under more than one category. Several test methods which did not fit specifically into any of the other categories are also listed here.

	NVLAP Test Method Code	*Test Method Designation*	*Short Title*
____	23/G01	ASTM D906	Strength Properties of Adhesives in Plywood Type Construction in Shear by Tension Loading
____	23/G02*	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials-Part A, Sec.11-20: Static Bending
____	23/G03	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials-Part A, Sec.28-33: Tensile Strength Perpendicular to Surface
____	23/G04	ASTM D2395	Specific Gravity of Wood and Wood-Base Materials-Method A: Volume by Measurement
____	23/G05	ASTM D2718	Structural Panels in Planar Shear (Rolling Shear)

_____	23/G06	ASTM D2719	Structural Panels in Shear Through-the-Thickness Method C: Two-Rail Shear
_____	23/G07	ASTM D3043	Structural Panels in Flexure, Method C: Pure Moment Test
_____	23/G08	ASTM D4442	Direct Moisture Content Measurement of Wood and Wood-Base Materials, Method A: Primary Oven-Drying
_____	23/G09	ASTM D4442	Direct Moisture Content Measurement of Wood and Wood-Base Materials: Method B: Secondary Oven-Drying
_____	23/G10	ASTM E72	Strength Tests of Panels for Building Construction: Racking Load-Evaluation of Sheathing Materials on a Standard Wood Frame
_____	23/G11	ASTM E72	Strength Tests of Panels for Building Construction: Racking Load-Evaluation of Sheathing Materials (Wet) on a Standard Wood Frame
_____	23/G12	ASTM E564	Static Load Test for Shear Resistance of Framed Walls for Buildings
_____	23/G13	ASTM E695	Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading
_____	23/G14	AFG-01-84	Adhesives for Field-Gluing Plywood to Wood Framing-Sec. 3.1: Shear Strength (APA)
_____	23/G15	AFG-01-84	Adhesives for Field-Gluing Plywood to Wood Framing-Sec. 3.2: Durability (APA)
_____	23/G16	ASTM E489	Tensile Strength Properties of Metal Connector Plates
_____	23/G17	ASTM E767	Shear Strength Properties of Metal Connector Plates

PARTICLEBOARD AND MEDIUM-DENSITY FIBERBOARD

Physical/Mechanical Properties

_____	23/P01	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials-Part A, Section 21-27: Tensile Strength Parallel to Surface

____	23/P02	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec.61-67: Direct Screw Withdrawal Test
____	23/P03	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec.68-73: Hardness
____	23/P04	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec. 81-86: Shear Strength in the Plane of the Board
____	23/P05	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec.100-106: Water Absorption and Thickness Swelling
____	23/P06	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec.107-110: Linear Variation with Change in Moisture Content
____	23/P07	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec.118-124: Accelerated Aging
____	23/P08	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Part A-Sec. 126-127: Moisture Content and Specific Gravity
____	23/P09	ANSI/A208.1	Wood Particleboard-Sec.3.4.4: Concentrated Load

Formaldehyde

____	23/T01*	ASTM E1333	Determining Formaldehyde Levels From Wood Products Under Defined Test Conditions Using a Large Chamber
____	23/T02*	FTM 1-83	Small Scale Method for Determining Formaldehyde Emissions from Wood Products: Two Hour Desiccator
____	23/T03	EN 120:92	Wood-Based Panels-Determination of Formaldehyde Content, Extraction Method Called the Perforator Method. CEN, European Committee for Standardization. Brussels, Belgium. (English)

STRUCTURAL-USE PANELS

_____	23/S01	ASTM D3044	Shear Modulus of Plywood
_____	23/S02	ASTM D3500	Structural Panels in Tension: Method B: Tensile Strength of Large Specimens
_____	23/S03	ASTM D3501	Plywood in Compression-Method B: Compression Test for Large Specimens
_____	23/S04	ASTM E661	Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads
_____	23/S05**	PS-1	Construction and Industrial Plywood- Sec.4.5.2: Vacuum-Pressure
_____	23/S06	PS-1	Construction and Industrial Plywood- Sec.4.5.3: Boiling
		(CAN/CSA-0325.1-88)	(Test Methods for Construction Sheathing-Clauses 3.1.13: Boiling; 5.15: Plywood Shear)
_____	23/S07	PS-2	Wood-Based Structural Use Panels-Sec.6.4.1: Performance Under Concentrated Static and Impact Loads
		(CAN/CSA-0325.1-88)	(Test Methods for Construction Sheathing-Clause 5.26: Concentrated Static and Impact Loads)
_____	23/S08	PS-2	Wood-Based Structural-Use Panels-Sec.6.4.2: Performance Under Uniform Loads
		(CAN/CSA-0325.1-88)	(Test Methods for Construction Sheathing-Clause 5.27: Uniformly Distributed Loads)
_____	23/S09	PS-2	Wood-Based Structural-Use Panels-Sec.6.4.4: Fastener-holding Performance, Lateral Loads, Direct Withdrawal Loads
		(CAN/CSA-0325.1-88)	(Test Methods for Construction Sheathing-Clauses 5.23: Nail Lateral Resistance, 5.24: Nail Withdrawal Resistance)
_____	23/S10	PS-2	Wood-Based Structural-Use Panels-Sec.6.4.7: Linear Expansion and Thickness Swell Measured from Oven Dry to Vacuum-Pressure Soak
		(CAN/CSA-0325.1-88)	(Test Methods for Construction Sheathing-Clause 5.8: Linear Expansion—Oven Dry to Vacuum Pressure Soak)

____ 23/S11	PS-2 (CAN/CSA-0325.1-88)	Wood-Based Structural-Use Panels-Sec.6.4.8: Linear Expansion and Thickness Swell Measured after Wetting on One Side (Test Methods for Construction Sheathing-Clauses 5.10: Linear Expansion—One Side Wetting; 5.11: Thickness Swell—One Side Wetting)
____ 23/S12	PS-2 (CAN/CSA-0325.1-88)	Wood-Based Structural-Use Panels-Sec.6.4.9: Linear and Thickness Expansion Measured by Exposure to Relative Humidity (Test Methods for Construction Sheathing-Clause 5.9: Linear Expansion—50 to 90% Relative Humidity)
____ 23/S13	PS-2 (CAN/CSA-0325.1-88)	Wood-Based Structural-Use Panels-Sec.6.4.17: Moisture Cycle for Quality Assurance (Single Cycle Test) (Test Methods for Construction Sheathing-Clause 3.1.7: Single-Cycle Soak)
____ 23/S14	PS-2 (CAN/CSA-0325.1-88)	Wood-Based Structural-Use Panels-Sec.6.4.18: Moisture Cycle for Delamination and Strength Retention (Six-Cycle Test) (Test Methods for Construction Sheathing-Clause 3.1.6: Six-Cycle Soak)
____ 23/S15	PS-2 (Supplement No. 1-92 to CAN/CSA-0325.1-88)	Wood-Based Structural-Use Panels-Sec.6.4.19: Bond Durability Associated with Knotholes (Test Methods for Construction Sheathing-Clause 5.32: Concentrated Static and Impact Loads at Location of Defect)
____ 23/S16	PS-2 (Supplement No. 1-92 to CAN/CSA-0325.1-88)	Wood-Based Structural-Use Panels-Sec.6.4.20: Radial Probe (Test Methods for Construction Sheathing-Clause 5.31: Radial Probe Test)

HARDWOOD PLYWOOD

____ 23/H01	HP-1	Interim Voluntary Standard for Hardwood and Decorative Plywood-Sec.4.3: Dry Shear
____ 23/H02	HP-1	Interim Voluntary Standard for Hardwood and Decorative Plywood-Sec.4.4: Cyclic-Boil Shear

_____	23/H03	HP-1	Interim Voluntary Standard for Hardwood and Decorative Plywood-Sec.4.6: Three-Cycle Soak
_____	23/H04	ASTM E96	Water Vapor Transmission of Materials

STRUCTURAL COMPOSITE LUMBER, GLULAM, I-JOISTS, LAMINATED VENEER LUMBER

_____	23/J01	ASTM D143	Small Clear Specimens of Timber Sec.47-54: Static Bending
_____	23/J02	ASTM D143	Small Clear Specimens of Timber Sec.90-94: Shear Parallel to Grain
_____	23/J03	ASTM D143	Small Clear Specimens of Timber Sec.100-104: Tension Parallel to Grain
_____	23/J04	ASTM D198	Static Tests of Timbers in Structural Sizes Sec.4-11: Flexure
_____	23/J05	ASTM D198	Static Tests of Timbers in Structural Sizes Sec.28-35: Tension Parallel to Grain
_____	23/J06	ASTM D905	Strength Properties of Adhesive Bonds in Shear by Compression Loading
_____	23/J07	ASTM D1037	Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials-Part A-Sec. 87-90: Glue-Line Shear (Block Type)
_____	23/J08	ASTM D1101	Integrity of Glue Joints in Structural Laminated Wood Products for Exterior Use
_____	23/J09	ASTM D1761	Mechanical Fasteners in Wood- Sec.1-11: Nail, Staple, or Screw Withdrawal
_____	23/J10	ASTM D2559	Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions: Resistance to Shear by Compression Loading
_____	23/J11	ASTM D2559	Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions: Resistance to Delamination During Accelerated Exposure
_____	23/J12	ASTM D4688	Evaluating Structural Adhesives for Fingerjointing Lumbers

____	23/J13	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T106: Strip Tension Test for End Joints (Used in Lamination Repair)(except for "or at a load rate that is approved by the AITC Inspection Bureau," Sec. 7.5.8.1)
____	23/J14**	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T107: Shear Test
____	23/J15	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T110: Cyclic Delamination
____	23/J16	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T114: Bending Test for End Joints
____	23/J17	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T116: Modulus of Elasticity of E-Rated Lumber by Static Loading
____	23/J18**	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T119: Full Size End Joint Tension
____	23/J19	AITC 200	Inspection Manual for Structural Glued Laminated Timber-T123: Sampling, Testing and Data Analysis to Determine Tensile Properties of Lumber

SANDWICH CONSTRUCTIONS

____	23/X01	ASTM C273	Shear Properties in Flatwise Plane of Flat Sandwich Constructions or Sandwich Cores
____	23/X02	ASTM C297	Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
____	23/X03	ASTM C365 (Method A)	Flatwise Compressive Strength of Sandwich Cores
____	23/X04	ASTM C393	Flexural Properties of Flat Sandwich Constructions
____	23/X05	ASTM C480	Flexure-Creep of Sandwich Constructions
____	23/X06	ASTM C481	Laboratory Aging of Sandwich Constructions
____	23/X07	ASTM D1183	Resistance of Adhesive to Cyclic Laboratory Aging Conditions

TREATED WOOD PRODUCTS

_____	23/C01	AWPA A5 (Section 5)	Determination of Chloride for Calculating Pentachlorophenol in Solution or Wood
_____	23/C02	AWPA A6 (Section 1)	Determination of Oil-Type Preservatives in Wood by Extraction
_____	23/C03	AWPA A9	Analysis of Treated Wood and Treating Solutions by X-Ray Fluorescence Spectroscopy
_____	23/C04	AWPA A11	Analysis of Treated Wood and Treating Solutions by Atomic Absorption (AA) Spectroscopy

FIRE TESTS

_____	23/F01*	ASTM E84	Surface Burning Characteristics of Building Materials
_____	23/F02	ASTM E906	Heat and Visible Smoke Release Rates for Materials and Products
_____	23/F03	ASTM E1354	Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

_____ Total number of test methods selected for Wood Based Products
(Enter total on Line 5b of the Program Fee Calculation Worksheet.)

APPENDIX E

CRITICAL ELEMENTS

CRITICAL ELEMENTS

DESCRIPTION: "Critical elements" are summary statements of key provisions from standard test methods. These summaries are provided to the Technical Experts for use during on-site assessments, as part of their operation manual. This appendix shows the format of a critical element summary, but the critical elements for the WBP Program are not included in this handbook.

PURPOSE: Critical elements assist the assessors in uniformly and objectively conducting their evaluations. The critical elements provide guidance for a common basis to be applied by individual assessors in conducting on-site evaluations. They are *not* intended to be replacements for the written test procedures issued by standards-development organizations.

FORMAT OUTLINE: Typically, the critical element summary includes the headings listed below. The explanatory comments given below indicate the type of information summarized under each heading.

PROGRAM TITLE: The title of the specific NVLAP program; in the present case, the WBP Program.

NVLAP TEST METHOD CODE: The code for each test method given on the Test Method Selection List for the specific NVLAP program.

TEST METHOD DESIGNATION: An alphanumeric designation assigned to the test method by the organization that issued the standard; for example, designations include ASTM, AITC, EN, AWPA, etc., in the case of the WBP Program.

SHORT TITLE: The title of the test method as given on the NVLAP Test Method Selection List.

ENVIRONMENTAL/SAMPLE AND CONDITIONING REQUIREMENTS: A summary of conditioning or other treatment to which the test specimen is subjected before the test is conducted.

TEST EQUIPMENT AND APPARATUS: A listing of the major equipment and apparatus that the laboratory needs to have available to conduct the test.

CALIBRATION(S): A summary of the calibration requirements delineated in the test method.

TESTING PROCEDURES: A summary of the main steps of the test method.

STANDARD TEST REPORT REQUIREMENTS: A listing of the items that the method requires the test operator to include in the test report.

SPECIAL CONSIDERATIONS: A listing of those aspects of the test method to which the NVLAP technical assessor must pay special attention during the on-site assessment.

APPENDIX F

ON-SITE ASSESSMENT - TEST METHOD REVIEW

NVLAP LAB CODE: [ ]

NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM

ON-SITE ASSESSMENT - TEST METHOD REVIEW

Instructions to the Assessor:

During the on-site visit you will be required to assess the laboratory's ability to conduct the specific test methods for which it has applied for accreditation. In some cases this will involve many test methods. You may not have sufficient time to perform an in-depth assessment of each method.

Use the attached sheets to indicate which test methods you assessed at the laboratory, and the extent of your assessment. Indicate whether you performed an in-depth review, including a full review of laboratory activities. These include sample control and preparation, procedure review, observation of actual testing, environmental control check, equipment review, calibration checks, record-keeping practices and report forms; or, that you observed selected items to determine that the laboratory demonstrated the ability to conduct the test.

The specific requirements for each test method are detailed in the CRITICAL ELEMENTS, the HANDBOOK, and/or the TEST METHOD. Any items required under "special considerations" will be described either in the CRITICAL ELEMENTS, special instructions below, or in other correspondence.

Fill out the ON-SITE ASSESSMENT - TEST METHOD REVIEW SUMMARY by writing in the test method designation. Indicate on the summary the DEPTH of the assessment for each test method you reviewed, using one of the symbols shown below:

OT - (Observed Test)
EA - (Examined Apparatus)
W/TT - (Walked/Talked Through)
LDP - (Listened to Description of Procedures)

All ***deficiencies*** must be accompanied by a comment.

Use the ON-SITE ASSESSMENT - TEST METHOD REVIEW COMMENTS AND DEFICIENCIES sheets to write comments on what you observed. Preface each comment with the test method designation to which the comment applies. Please be liberal with your comments so that we have a good written record of your observations; the more information we have, the better the accreditation decision we can make.

Special Instruction:

National Voluntary Laboratory Accreditation Program (NVLAP)

ON-SITE ASSESSMENT - TEST METHOD REVIEW SUMMARY

Test Method (number, name or designation)	Depth of Assessment	Environmental/ Test Sample Conditioning	Test Equipment and Apparatus	Calibration	Test Procedures	Test Reports	Special Considerations

NVLAP LAB CODE: ____

ON-SITE ASSESSMENT - TEST METHOD REVIEW COMMENTS AND DEFICIENCIES

Instructions to the Assessor: Use this sheet to document comments and deficiencies. For each, identify the appropriate item number. Identify comments with a "C" and deficiencies with an "X." If additional space is needed, make copies of this page (or use additional blank sheets).

Item Number	*Comments and/or Deficiencies as Noted on the On-Site Assessment - Test Method Review Summary*

NIST Technical Publications

Periodical

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